Book Review for Archives of Biochemistry and Biophysics

Nucleo-cytoplasmic Relations in Micro-organisms,

by

Boris Ephrussi, Professor of Genetics,
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Oxford University Press, 1953.

viii + 127 pp. + 1 plate. Price $.

These lectures support the theme that "persistent divergence of cell lines can be achieved through the sole agency of cytoplasmic variation," as distinguished from the more familiar processes of mutation in chromosomal factors. Embryonic differentiation is in the foreground but we cannot yet do a genetic analysis of metazoan ontogeny and analogies from microbes must be stressed. The text is then a lucid, sometimes drôle, review of cytoplasmic heredity in microorganisms: Ephrussi's own superb studies on respiratory elements in yeast, his colleague Rizet on mycelial barrage in the ascomycete Podospora, and Sonneborn on Paramecium. This material is already familiar to genetic specialists and has been sympathetically received by most (cf. Advances in Genetics 2:1-66, 1948; Heredity 4:11-36, 1950; Science in Progress 7:167-203, 1951; Physiol. Rev. 32:403-430, 1952). The present work should be useful in further extending an appreciation of these concepts to a wider audience.

It is now accepted that the cytoplasm cannot be summarily dismissed in heredity. Whether the paucity of concrete examples results primarily from technical

obstacles remains to be settled. However, if the cytoplasm is not now to be overlooked in heredity, the nucleus must still be considered in development; it does not follow that "Unless development involves a rather unlikely process of orderly and directed gene mutation, the differential must have its seat in the cytoplasm." McClintock has acquainted us with chromosomal modifications (quite distinct from sporadic, atelic mutations as usually understood) which can serve as an equally inspiring model of differentiation. As Ephrussi suggests, for additional reasons, the embryologists may still have to study embryos.

An all too brief addendum touches on most elusive concepts, e.g., the ambiguity of "autoreproduction," of which much more still needs to be said. The tocsin to reconsider the whole organism as the effective unit in this process is welcome. But a deeper analysis will sometime be required of, for example, the formal equivalence of "autoreproduction" with models (e.g. Delbrück's) of flux equilibria including degenerative feedback across chains, here quoted as alternative explanations.

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